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ATTORNEY'S DOCKET NUMBER: 032326-181

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.5): Unassigned 09/980863

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/FR00/01550	7 June 2000	9 June 1999

TITLE OF INVENTION: COMPUTER-ASSISTED TICKETING SYSTEM WITH MULTIPLE OPERATORS

APPLICANT(S) FOR DO/EO/US: Pierre GIROD

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☐ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☐ is attached hereto (required only if not communicated by the International Bureau).
   b. ☒ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☒ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
14. ☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☐ Other items or information:

21839

JC10 Rec'd PCT/PTO 07 DEC 2001

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
Unassigned 09/980863	PCT/FR00/01550	032326-181

21. ☒ The following fees are submitted:	CALCULATIONS	PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5)):		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO $1,040.00 (960)		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO $890.00 (970)		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO $740.00 (958)		
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) $710.00 (956)		
International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) $100.00 (962)		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 890.00	
Surcharge of **$130.00 (154)** for furnishing the oath or declaration later than 20 ☐ 30 ☐ months from the earliest claimed priority date (37 CFR 1.492(e)).	$ -0-	

Claims	Number Filed	Number Extra	Rate		
Total Claims	16 -20 =	-0-	X$18.00 (966)	$ -0-	
Independent Claims	1 -3 =	-0-	X$84.00 (964)	$ -0-	
Multiple dependent claim(s) (if applicable)			+$280.00 (968)	$ -0-	
TOTAL OF ABOVE CALCULATIONS =				$ 890.00	
Reduction for 1/2 for filing by small entity, if applicable (see below).			+	$ -0-	
SUBTOTAL =				$ 890.00	
Processing fee of **$130.00 (156)** for furnishing the English translation later than 20 ☐ 30 ☐ months from the earliest claimed priority date (37 CFR 1.492(f)).			+	$ -0-	
TOTAL NATIONAL FEE =				$ -0-	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00 (581)** per property			+	$ -0-	
TOTAL FEES ENCLOSED =				$ 890.00	
				Amount to be refunded:	$
				charged:	$

a. ☐ Small entity status is hereby claimed.

b. ☒ A check in the amount of $ 890.00 to cover the above fees is enclosed.

c. ☐ Please charge my Deposit Account No. 02-4800 in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

d. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 02-4800. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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SIGNATURE

James A. LaBarre
NAME

28,632
REGISTRATION NUMBER

December 7, 2001
DATE

Patent
Attorney's Docket No. 032326-181

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of	)	
	)	
	)	Group Art Unit: Unassigned
	)	
Application No.: Unassigned	)	Examiner: Unassigned
	)	
Filed: December 7, 2001	)	
	)	
For: COMPUTER-ASSISTED TICKETING SYSTEM WITH MULTIPLE OPERATORS	)	

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination and the calculation of filing fees, kindly amend the above-identified application as follows:

IN THE SPECIFICATION:

Page 1, immediately following the title appearing on lines 1 and 2, insert the following:

--This disclosure is based upon French Application No. 99/07288, filed on June 9, 1999 and International Application No. PCT/FR00/01550, filed June 7, 2000, which was published on December 14, 2000 in a language other than English, the contents of which are incorporated herein by reference.

Background of the Invention--

Page 5, before line 18, insert the following heading:

--**Summary of the Invention**--

Page 7, between lines 26 and 27, insert the following heading:

--**Brief Description of the Drawings**--

Page 8, before line 11, insert the following heading:

--**Description of the Invention**--

Add the following Abstract:

--In computer-assisted ticketing systems with multiple operators, stations that provide access to services (telephone or banking or public transport) are able to separately process data on a ticket issued by another operator. The links between a consulate which provides such processing and the validator are reduced to a minimum, so that the data concerning the ticket validation processing cannot be known by one or the other of the operators. It enables interoperability through safe, discreet and decentralized techniques.--

IN THE CLAIMS:

Kindly replace claims 1-16, as follows.

1. (Amended) A multi-operator ticketing system comprising first means specific to a first operator for acquiring the content of a ticket issued by said first operator and for authorising a service according to the information acquired, and consulate means

for receiving information from a ticket issued by another operator and for transmitting to the first means authorisation to render said service according to the information obtained and processed in a manner specific to the consulate means.

2. (Amended) A system according to Claim 1, wherein the service authorisation is dependent on the prior performance of a transaction.

3. (Amended) A system according to Claim 1 wherein the methods of processing information by the first means and the consulate means are concealed with respect to each other.

4. (Amended) A system according to claim 1 wherein the consulate means is physically included in the first means.

5. (Amended) A system according to claim 1 wherein the consulate means is physically external to the first means.

6. (Amended) A system according to claim 1 further including a central unit and a set of remote stations to acquire the content of the tickets and to perform the transactions, which remote stations are connected to the central unit by first transmission circuits.

7. (Amended) A system according to Claim 6, wherein each remote station comprises a consulate.

8. (Amended) A system according to claim 6 wherein the central unit comprises second transmission circuits for transmitting to the central unit of the other operator the data corresponding to the transactions effected on behalf of said other operator.

9. (Amended) A system according to claim 6 wherein the central unit comprises third transmission circuits for transmitting from the central unit of the other operator to the consulate means the information concerning the methods of processing, by the consulate means, of the information carried by the ticket.

10. (Amended) A system according to claim 6 wherein said services pertain to a common transportation system and the remote stations are validators for access to transportation vehicles, the information carried by the tickets being read by the validators.

11. (Amended) A system according to Claim 10, wherein the tickets are information carriers such as tickets with a magnetic strip, plastic or cardboard, or contact or contactless smart cards.

12. (Amended) A system according to claim 6 wherein the services pertain to a mobile telephony system and the remote stations are base stations in mobile telephony networks, the information carried by the tickets being read by mobile telephones and transmitted to the base stations.

13. (Amended) A system according to Claim 12, wherein the tickets are in portable telephone form with associated mobile telephony smart card.

14. (Amended) A system according to claim 6 wherein the services pertain to a banking system and the remote stations are dispensing terminals, the information carried by the tickets being read by the dispensing terminals.

15. (Amended) A system according to Claim 14, wherein the tickets are in the form of credit cards, with a chip or magnetic tape.

16. (Amended) A system according to claim 1, wherein the services pertain to systems with different purposes.

REMARKS

Entry of the foregoing amendment is respectfully requested. This amendment is intended to place the claims in a more conventional format and eliminate the multiple dependency of the claims.

Respectfully submitted,

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Date: December 7, 2001

Attachment to Preliminary Amendment dated December 7, 2001

Marked-up Claims 1-16

1. (Amended) A multi-operator ticketing system [which comprises] comprising first means [(103)] specific to a first operator for acquiring the content of a ticket [(104)] issued by [this] said first operator and for authorising a service according to the information acquired, [characterised in that it also comprises second means (106), referred to as "] and consulate["] means[,] for receiving [the] information [when they come] from a ticket [(105)] issued by another operator and for transmitting to the first means [a simple] authorisation to render [the] said service according to the information obtained and processed in a manner specific to the consulate means.

2. (Amended) A system according to Claim 1, [characterised in that] wherein the service authorisation is dependent on the prior performance of a transaction.

3. (Amended) A system according to Claim 1 [or 2, characterised in that] wherein the methods of processing information by the first means [(103)] and the consulate means [(106)] are concealed with respect to each other.

4. (Amended) A system according to [any one of Claims 1 to 3, characterised in that] claim 1 wherein the consulate [(106)] means is physically included in the first means [(103)].

Attachment to Preliminary Amendment dated December 7, 2001

Marked-up Claims 1-16

5. (Amended) A system according to [any one of Claims 1 to 3, characterised in that] claim 1 wherein the consulate [(106)] means is physically external to the first means [(103)].

6. (Amended) A system according to [any one of Claims 1 to 3, characterised in that the system comprises] claim 1 further including a central unit [(101)] and a set of remote stations [(103) intended] to acquire the content of the tickets and to perform the transactions [and] , which remote stations are connected to the central unit by first transmission circuits [(102)].

7. (Amended) A system according to Claim 6, [characterised in that] wherein each remote station [(103)] comprises a consulate [(106)].

8. (Amended) A system according to [either one of Claims 6 and 7, characterised in that] claim 6 wherein the central unit [(101)] comprises second transmission circuits [(107)] for transmitting to the central unit of the other operator [(201)] the data corresponding to the transactions effected on behalf of [this] said other operator.

9. (Amended) A system according to [any one of Claims 6 to 8, characterised in that] claim 6 wherein the central unit comprises third transmission circuits [(108)] for

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Marked-up Claims 1-16

transmitting from the central unit of the other operator [(201)] to the consulate means [(106)] the information concerning the methods of processing, by the consulate means, of the information carried by the ticket [(105)].

10. (Amended) A system according to [any one of Claims 1 to 9, characterised in that it is applied] claim 6 wherein said services pertain to a common transportation system and [in that] the remote stations [(103)] are validators for access to [the] transportation vehicles, the information carried by the tickets being read by the validators.

11. (Amended) A system according to Claim 10, [characterised in that] wherein the tickets are information carriers such as tickets with a magnetic strip, plastic or cardboard, or contact or contactless smart cards.

12. (Amended) A system according to [any one of Claims 1 to 9, characterised in that it is applied] claim 6 wherein the services pertain to a mobile telephony system and [in that] the remote stations [(103)] are base stations in mobile telephony networks, the information carried by the tickets being read by mobile telephones and transmitted to the base stations.

Attachment to Preliminary Amendment dated December 7, 2001

Marked-up Claims 1-16

13. (Amended) A system according to Claim 12, [characterised in that] wherein the tickets are in portable telephone form with associated mobile telephony smart card [(GSM or UMTS standards)].

14. (Amended) A system according to [any one of Claims 1 to 9, characterised in that it is applied] claim 6 wherein the services pertain to a banking system and [in that] the remote stations [(103)] are dispensing terminals, the information carried by the tickets being read by the dispensing terminals.

15. (Amended) A system according to Claim 14, [characterised in that] wherein the tickets are in the form of credit cards, with a chip or magnetic tape.

16. (Amended) A system according to [any one of the preceding claims, characterised in that it is applied] claim 1, wherein the services pertain to systems with different purposes.

COMPUTER-ASSISTED TICKETING SYSTEM WITH MULTIPLE OPERATORS

The present invention relates to ticketing systems which can be used simultaneously by several operators in a manner which is transparent to the user.

Ticketing system means a system in which there is a dual one transaction - one contract association (this is the case for example with transport systems) or a multiple one contract - n transactions association (that is to say each time there is a transaction there is a reference to a general contract, the one made with an operator (for example a mobile telephony operator or a bank card group, for the payment aspects)).

The invention consequently applies to any transaction system which can be used by several operators. The invention applies in particular to radio telephony, banking networks and transportation systems.

It enables the clients of an operator to use indifferently the services and/or infrastructures of another operator in a manner which is transparent to the user.

In the case of mobile telephony systems, a user who has entered into a contract with a telephony operator can make telephony transactions using equipment of another operator or operators or a user of the telephone network.

In the case of banking systems, the customers of several banks can effect transactions with the equipment of these banks or a user of the banking network without connection to an authorisation centre.

In the case of public transportation systems, the customers of several transporters can use indifferently the means of transportation of these operators with transportation rights issued indifferently by these operators and able to be used without distinction on each of the transportation means.

It is known that, in the service provision systems offered by major operators for the public, there are different operating modes enabling the operators to have a more or less captive customer base.

For example, in the case of cellular telephone systems, the networks are completely distinct and a user can use only the network of the operator to which he has subscribed unless there is specific agreement between the said operators. This solution is for the moment viable since, because of the large number of subscribers, the operators can afford to have networks

which are either superimposed or substantially continuous. It is however quite clear that, for areas with a low population density, and because of this badly served, it would certainly be desirable for the clients to be able to access the different networks, in a transparent manner if possible, in order to ensure a truly complete coverage on economically acceptable terms. This of course poses the problem of charges and the invoicing of calls passing through a network to which the subscriber does not belong. This problem is particularly crucial because of the trade war currently going on between the operators and which results in their having a large number of distinct invoicing methods according to the operators, and ones which are frequently variable.

An example of multiple access is currently encountered in the cabled telephone network, for which there exists, in the recently liberalised countries, only one physical network belonging to a historical operator. The customers who wish to use the services of another operator must necessarily pass through the existing physical network and identify the operator which they wish to use by means of a prefix. In fact even the switching systems belong to the historical operator owning the physical network and the other operators merely rent the communication routing capacities, which they then resell to their customers. They make their revenue on the difference in price between the wholesale renting and the retail. It can be seen that the invoicing system is based essentially

on the processing of data concerning the actual communications, data which are collected by the historical operator and then communicated to the new operators. It can be seen that the new operators are thus completely bound to the historical operator and must trust him with regard to the validity of the data received, which is not without drawback between direct competitors.

One of the major current problems is that of the use of public transportation by users who wish, using a ticket purchased for example from a railway company, then to be able to use the underground, then a bus - and even any combination of these different transportation means, whether or not operated by distinct operators.

Currently, for individual tickets, the tendency for the different transporters is each to sell their ticket for their portion of the journey. This solution is manifestly unsatisfactory. It would be even more so for subscriptions, which has led to the setting up of systems of the travelcard type.

The distribution of receipts originating from this subscription system is effected on a statistical basis, always subject to guarantee.

There is therefore a serious problem of interoperability, this term being defined as the possibility for a user, from a ticket or subscription right purchased from the transporter who suits him the best, to be able to use all the other transporters in

his region, within limits of time and distance defined by the initial ticket.

It should be noted that this problem has been resolved in the case of bank cards (of the debit card type), but the solution adopted, of the pyramidal type, comprises a single operator who federates all the banking parties and who remains anonymous to the user. The latter uses a card issued by his bank, which is in fact common to everyone and is distinguished only by decorative aspects.

This system has the drawback of requiring good agreement between all the federated parties in the common organisation. This good agreement is obtained only at the cost of a certain degree of effacement of the smallest partners. In spite of everything it gives rise to a lack of flexibility and ability to react in the face of desirable concrete changes.

In order to mitigate these drawbacks of these systems, which are termed "ticketing" systems, the invention proposes a multi-operator ticketing system which comprises first means specific to a first operator for acquiring the content of a ticket issued by this operator and for authorising a service according to the information acquired, principally characterised in that it also comprises second means, referred to as "consulate" means, for receiving the information when they come from a ticket issued by another operator and for transmitting to the first means a simple authorisation to render the said service

according to the information thus known and processed in a manner specific to the consulate.

According to another characteristic, the service authorisation is dependent on the prior performance of a transaction.

According to another characteristic, the methods of processing information by the first means and the consulate are concealed with respect to each other.

According to another characteristic, the consulate is physically included in the first means.

According to another characteristic, the consulate is physically external to the first means.

According to another characteristic, the system comprises a central unit and a set of remote stations intended to know the content of the tickets and to perform the transactions and connected to the central unit by first transmission circuits.

According to another characteristic, each remote station comprises a consulate.

According to another characteristic, the central unit comprises second transmission circuits for transmitting, to the central unit of the other operator, the data corresponding to the transactions performed on behalf of this other operator.

According to another characteristic, the central unit comprises third transmission circuits for transmitting, from the central unit of the other operator to the consulate, the information concerning the modes of processing, by the consulate, of the information carried on the ticket.

According to another characteristic, the system is applied to a system of public transportation and the remote stations are validators for access to the transportation vehicles. In this case, the tickets are information carriers such as tickets with a magnetic strip, plastic or cardboard, or smart cards with or without contact.

According to another characteristic, the system is applied to a mobile telephony system and the remote stations are radio telephone network base stations, the information carried by the tickets being read by mobile telephones and transmitted to the base stations.

In this case, the tickets are in the form of portable telephone - associated mobile telephony smart card (GSM or UMTS standards).

According to another characteristic, the system is applied to a banking system and the remote stations are distributed terminals, the information carried by the tickets being read by the dispensing terminals.

In this case, the tickets are in the form of credit cards, with a chip or magnetic strip.

According to another characteristic, the system is applied to systems with different purposes.

In fact, the system can be applied to transportation and parking systems or to transportation and commercial loyalty systems.

Other particularities and advantages of the invention will emerge clearly from the following description, presented by way of non-limitative example with regard to the accompanying drawings, in which:

Figure 1 depicts the simplified block diagram of a system according to the invention;

Figure 2 depicts the block diagram of a system according to the invention applied to a mobile telephony network belonging to an operator distinct from the telephony operators;

Figure 3 depicts the block diagram of a system according to the invention applied to a banking network belonging to an operator distinct from the banking operators (the banks).

The invention applies to all transaction systems able to be operated by several operators as stated previously in so far as ticketing system means a system in which there is a dual one transaction - one contract association (the case of transportation) or in cases where there is a multiple one contract - n transactions situation (that is to say each time there is a transaction there is reference to a general contract, the one entered into with the mobile telephony operator (the mobile telephone (GSM or UMTS)), or with the bank card group, for the payment aspects.

In addition, in order to simplify, the term "ticket" will be used for any means, physical or otherwise, allowing access to a "ticketing" system as defined above. Different possible forms are illustrated using examples of applications of the invention given hereinafter.

Figure 1 depicts the block diagram of a ticketing system according to the invention, in a variant limited

to the case where the operator Y accepts the customers of an operator X.

Figure 1 will be described with regard to a transportation system by way of example. Naturally, this diagram also applies to a mobile radio telephony system or to a banking network system.

In this simple version, the operator Y has a central unit 101 which provides the regulation of the entire system. This central unit is connected by links 102 to a set of remote stations 103 in which the services are operated. To give an idea, the central unit 101 is situated in the centralised service building of an urban bus company, and the stations 103 are the validators 110 situated in the bus, which authorise access for passengers to this bus. According to the size of the business, the simple links which are shown in the figure will be branched, with concentrators and intermediate processing devices.

In the ordinary functioning of the operator Y, a customer of this operator Y who gets into the bus validates his ticket 104 issued by Y, a smart card with contactless connection for example, by presenting it to the validator 110. The validator recognises the ticket, tests its validity for date, route etc and authorises the traveller to pass, for example by switching on a green light. In other circumstances, such as for example access to an underground station, the validator will for example actuate a turnstile.

Although it is possible to imagine using a validator provided with a minimum amount of

intelligence and effective validation at the unit 101 after transmission of the data over the link 102, and then retransmission of the authorisation by this same link, the most commonly used solution consists of providing the validator with sufficient intelligence, that is to say a computer which is sufficiently powerful and provided with sufficient memory to deal with the problem of validation locally in the station 103 itself.

The problem of interoperability consists of a traveller provided with a ticket 105 issued by the other operator X receiving from the validator 110 authorisation for access to the bus after having presented his ticket 105, without the processing resulting in the granting of this authorisation by the system Y being effected by the system itself in an identical fashion to the processing resulting in the issue of the authorisation given to the bearer of the ticket 104.

This is because such a processing mode would enable the operator Y to know the entire commercial policy of the operator X, as well as the characteristics, possibly including the name, of a major part of the customers of X. He could for example determine that certain customers of the operator X benefit from a particularly advantageous tariff and are major consumers, whom it would then be advantageous to approach directly.

The invention therefore proposes to delimit, in the station 103, a sub-assembly 106, which for the

convenience of the description will be referred to in the remainder of this text as a "consulate".

Depending on the embodiments of the invention, this consulate 106 can be formed by hardware means and/or software means distributed variably according to the requirements of implementation and/or the needs of distinct operators. The essential point is that the consulate 106 constitutes a structure which is sufficiently isolated with respect to the remainder of the station for the exchanges between these two parts to be strictly limited by the intent of the two operators, so that neither of the two can have access to the confidential data contained in the part reserved for the other.

According to other examples, the consulate can be in the unit 101 or between the unit and the stations.

The consulate 106 therefore comprises everything necessary for being able to decode the information contained on the ticket 105 issued by the operator X and validate access on board the bus for the traveller provided with this ticket 105.

The part of the station 103 reserved for the operator Y additionally includes, with respect to the situation where there is no consulate in this station, only the elements which are strictly necessary, a few lines of computer code for example, in order to be able to effect exchanges with the consulate 106, which are very simplified.

In more detail, when the validator 110 notes that the ticket 105 which is presented to it is a ticket of

the operator X, it immediately transmits to the consulate 106 the information which is read on this ticket, and which in principle has no signification for it since the essential data, the type of transportation contract for example, can very well be represented only by a few bytes, whose meaning is known only to the operator X, the said information being able to be accompanied by logistic data such as date and place.

The operator X then effects his validation processing, which in principle is similar to that effected by the validator 110 for the tickets 104, and retransmits to the validator the acceptance, or if appropriate the refusal, of access on board the bus. The validator then authorises, or refuses, access to the traveller.

Where necessary, for complex transportation systems, this acceptance is supplemented by a few data making it possible to qualify more profoundly the type of service rendered by the operator Y to the traveller of the operator X, for example an indication of actual travel distance covered.

These data are then transmitted to the central unit 101, either directly, or in non-real time, after storage throughout the day for example, by the link 102. They will then be transmitted from the central unit 101 of the operator Y to the central unit 201 of the operator X, so that the latter can manage his own customers and remunerate the operator Y for the services rendered to these same customers. This remuneration will take place according to an agreed

method which consists essentially in defining a particular tariff for each service rendered by the operator Y to the customers of the operator X. This corresponds to a particular tariff between the operator X and the operator Y, without the commercial agreements made between the operator X and his own customers playing any part, nor being known to the operator Y.

In the figure, this transmission has been represented by a link 107 from the central unit 101 to the central unit 201, but in practice it can be effected by another means, for example by the exchange of magnetic tapes, as is practiced between banks for compensation operations.

The consulate 106 therefore comprises a certain number of data, relating to tariff for example, liable to vary more or less frequently. In the example described for a bus transportation system, these changes are relatively infrequent, but they may be much more frequent in other applications, for example in systems for telecommunication by cellular telephone.

To facilitate the updating of these data, the invention also proposes to have them pass from the central unit 201 of the operator X to the consulate 106 contained in the terminal stations 103 by means of the central unit 101 of the operator Y and its links 102 with the stations 103.

For this purpose, these data, and more generally the entire programming of the consulate 106, are transmitted from the central unit 201 to the central unit 101 by means of a link 108, which is here

represented in a cabled fashion as the link 107, which can also use other means such as an exchange of magnetic tapes. These data will then be transmitted by the central unit 101 to the consulate 106 by means of the links 102 and the other components of the station 103.

Naturally, in order to keep the confidentiality of these data, for which this entire system was designed, this communication will take place by means of an encrypting system of a known type. Use will be made for example of a security application module known by the abbreviation SAM.

The invention also proposes to use such an SAM system for sending, from the consulate 106 to the central unit 201, a certain number of data relating to the customers provided with the ticket 105 and where the operator X does not wish for them to be known to the operator Y.

It is clear that, as described, the system requires a minimum of hardware and software compatibility between the ticketing systems of the operator X and of the operator Y.

Thus, in this example, the tickets 104 and 105 must be of the same type for the reader to be common. Likewise, the consulate must function under the same operating system as the remainder of the station 103.

The invention is however not limited to such a close compatibility. It extends to systems where the hardware and software would be much more different, but in accepting a complication in design and a cost which

is all the greater, the more this difference is accentuated.

It would thus be possible to have a ticket 104 with contactless reading and a ticket 105 with magnetic reading, therefore requiring two distinct readers. In this case, the outputs of the readers could be connected to a validator 110 and to a consulate 106 which are physically distinct, solely connected by links allowing the minimum of exchanges described above.

This solution would make it possible to increase security vis-à-vis intrusions on one operator by the other, but it would be noted immediately that it gives rise to a fairly unadvantageous proliferation of hardware.

This proliferation of hardware will be even less advantageous if not two operators X and Y are involved, as described above, but a set of operators X, Y, Z …, a situation in which the invention applies perfectly since it then suffices to have one consulate per external operator. This situation is fairly infrequent in the case of public transportation, but it can be much more frequent in other applications of the invention, for example in cellular telephone systems.

In practice, having regard to standardisations currently existing with the suppliers of components used for constructing the system, it is easy and without drawbacks to avoid such a proliferation.

Figure 2 illustrates a multi-operator ticketing system according to the invention applied to GSM or

UMTS mobile telephony networks in the case where the networks belong to an operator Z.

In fact, as stated above, the concept of neighbouring interoperability applies also to a mobile telephony environment in which the physical network is usable by distinct operators (the network belonging either to one of these operators or to an operator distinct from them and renting his infrastructure to these operators).

In this case, the consulate 106 takes the form of a component installed in the means 103, which are means specific to the network, namely the equipment of the base cell. The consulate 106 makes it possible to begin the dialogue between the pair consisting of smart card 105 and portable telephone TX (or smart card - telephone TY) and the network according to the same principle of identification of the operator X (or Y) issuing the smart card, identification of the user, recognition of his rights to consume and then recording of the data relating to the transaction.

According to the same methods these data, possibly encrypted (apart from those necessary for the operator Z of the infrastructure to claim payment from the operator concerned X (or Y), are recorded either at the base equipment or at the central system Z of the network operator for subsequent restitution to the operator X (or Y).

It is clear that this operating principle is distinct from that currently recommended in industrialised countries, where each operator is the

owner of his infrastructures, but it has a certain advantage for countries in which the infrastructure installation costs pose a serious problem.

Figure 3 illustrates a multi-operator ticketing system according to the invention, applied to banking networks in the case where the networks belong to an operator Z.

In fact, this concept of neighbouring interoperability applies also to a banking environment in which the stations 103 are the distributed terminals belonging to a bank and able to be used by distinct bankers without, in contradistinction to the system existing in France, there being any need to connect to an authorisation centre.

In this case, the consulate 106 takes the form of a component installed in the means 103, which are specific means of the banking network (the dispensing terminals). The consulate 106 begins the dialogue between this terminal 103 of a bank Y and the bank card 105 belonging to another bank X according to the same principle of identification of the bank issuing the card, identification of the user, recognition of his rights to consume and then recording of the data relating to the transaction.

According to the same methods these data, possibly encrypted (apart from those necessary to the operator of the infrastructure for reclaiming a payment from the banker concerned), are recorded at the bank terminal, and then repatriated to the central system of

the operator X of the network for subsequent restitution.

CLAIMS

1. A multi-operator ticketing system which comprises first means (103) specific to a first operator for acquiring the content of a ticket (104) issued by this operator and for authorising a service according to the information acquired, characterised in that it also comprises second means (106), referred to as "consulate" means, receiving the information when they come from a ticket (105) issued by another operator and for transmitting to the first means a simple authorisation to render the said service according to the information obtained and processed in a manner specific to the consulate.

2. A system according to Claim 1, characterised in that the service authorisation is dependent on the prior performance of a transaction.

3. A system according to Claim 1 or 2, characterised in that the methods of processing information by the first means (103) and the consulate (106) are concealed with respect to each other.

4. A system according to any one of Claims 1 to 3, characterised in that the consulate (106) is physically included in the first means (103).

5. A system according to any one of Claims 1 to 3, characterised in that the consulate (106) is physically external to the first means (103).

6. A system according to any one of Claims 1 to 3, characterised in that the system comprises a central unit (101) and a set of remote stations (103) intended

to acquire the content of the tickets and to perform the transactions and connected to the central unit by first transmission circuits (102).

7. A system according to Claim 6, characterised in that each remote station (103) comprises a consulate (106).

8. A system according to either one of Claims 6 and 7, characterised in that the central unit (101) comprises second transmission circuits (107) for transmitting to the central unit of the other operator (201) the data corresponding to the transactions effected on behalf of this other operator.

9. A system according to any one of Claims 6 to 8, characterised in that the central unit comprises third transmission circuits (108) for transmitting from the central unit of the other operator (201) to the consulate (106) the information concerning the methods of processing, by the consulate, of the information carried by the ticket (105).

10. A system according to any one of Claims 1 to 9, characterised in that it is applied to a common transportation system and in that the remote stations (103) are validators for access to the transportation vehicles, the information carried by the tickets being read by the validators.

11. A system according to Claim 10, characterised in that the tickets are information carriers such as tickets with a magnetic strip, plastic or cardboard, or contact or contactless smart cards.

12. A system according to any one of Claims 1 to 9, characterised in that it is applied to a mobile telephony system and in that the remote stations (103) are base stations in mobile telephony networks, the information carried by the tickets being read by mobile telephones and transmitted to the base stations.

13. A system according to Claim 12, characterised in that the tickets are in portable telephone form with associated mobile telephony smart card (GSM or UMTS standards).

14. A system according to any one of Claims 1 to 9, characterised in that it is applied to a banking system and in that the remote stations (103) are dispensing terminals, the information carried by the tickets being read by the dispensing terminals.

15. A system according to Claim 14, characterised in that the tickets are in the form of credit cards, with a chip or magnetic tape.

16. A system according to any one of the preceding claims, characterised in that it is applied to systems with different purposes.

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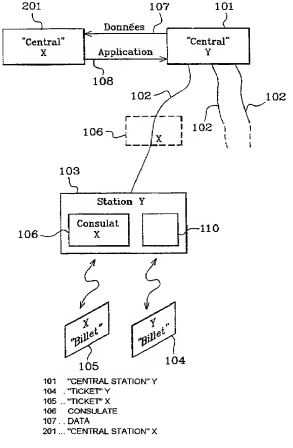
[Suite sur la page suivante]

(54) Title: COMPUTER-ASSISTED TICKETING SYSTEM WITH MULTIPLE OPERATORS

(54) Titre: SYSTEME DE BILLETTIQUE MULTI-OPERATEURS



(57) Abstract: The invention concerns computer-assisted ticketing systems with multiple operators, which consists in providing the stations (103) enabling access to services (telephone or banking or public transport), with means (106), called consulate for separately processing data read on a ticket (105) issued by another operator. The links between the consulate and the validator are reduced to a minimum so that the data concerning the ticket validation processing cannot be known by one or the other of the operators. It enables to provide interoperability through safe, discreet and decentralised means.

(57) Abrégé: L'invention concerne les systèmes de billettique multi-opérateurs. Elle consiste à munir les stations (103) permettant l'accès à des services (téléphonie ou bancaire ou transport en commun), de moyens (106) dits ≤ consulat ≥ pour traiter séparément les informations ≤ lues ≥ sur un billet (105) émis par un autre opérateur. Les liaisons entre le consulat et le valideur sont réduites au minimum pour que les informations concernant le traitement de validation du billet ne puissent pas être connues de l'un à l'autre des opérateurs. Elle permet d'effectuer une interopérabilité par des moyens sûrs, discrets et décentralisés.

WO 00/75875 A2

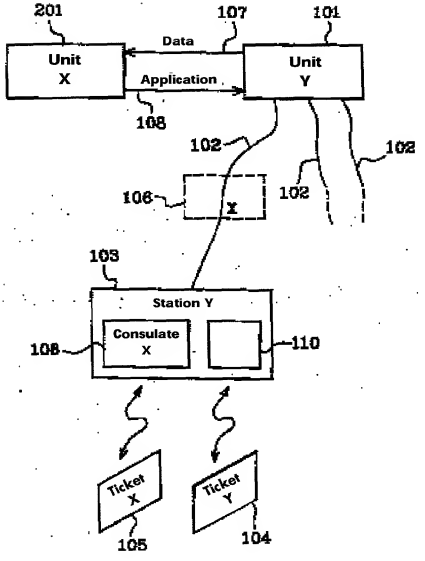


Fig. 1

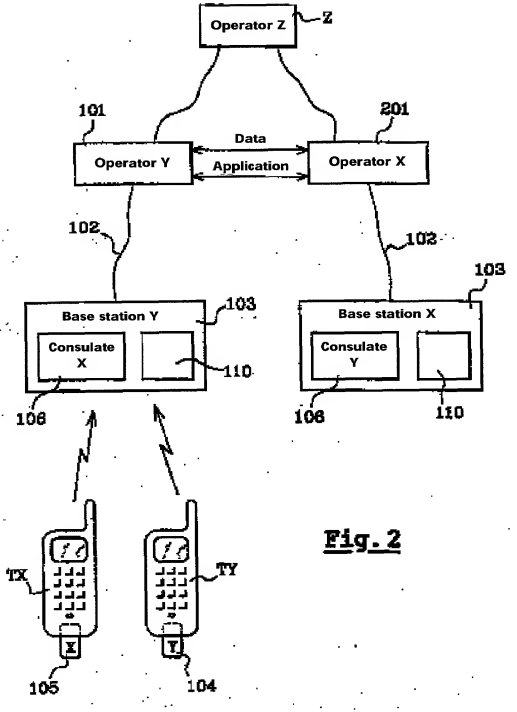


Fig. 2

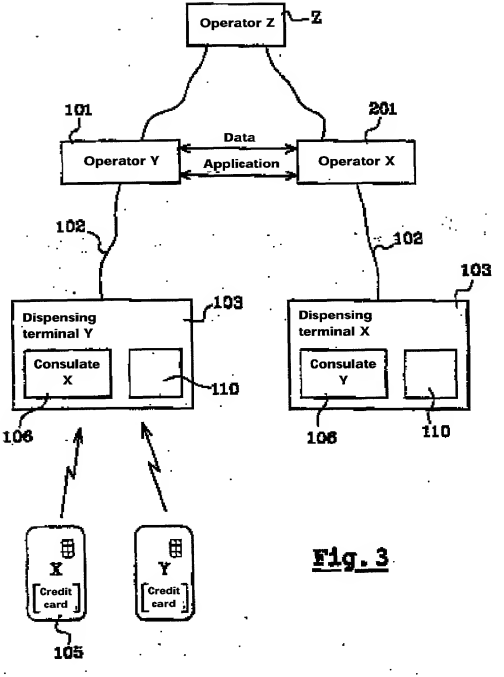


Fig. 3

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY (CONT'D) (Includes Reference to Provisional and International (PCT) Applications)	Attorney's Docket No.

FULL NAME OF SOLE OR FIRST INVENTOR GIROD Pierre	SIGNATURE	DATE 21 Mai 2002
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RESIDENCE (CITY & STATE/COUNTRY)		CITIZENSHIP
POST OFFICE ADDRESS (HOME ADDRESS		
FULL NAME OF THIRD JOINT INVENTOR, IF ANY	SIGNATURE	DATE
RESIDENCE (CITY & STATE/COUNTRY)		CITIZENSHIP
POST OFFICE ADDRESS (HOME ADDRESS		
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RESIDENCE (CITY & STATE/COUNTRY)		CITIZENSHIP
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RESIDENCE (CITY & STATE/COUNTRY)		CITIZENSHIP
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I hereby claim the benefit under Title 35, United States Code, § 120 of any United States applications(s) or International (PCT) Application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to me to be material to the patentability as defined in Title 37, Code of Federal Regulations § 1.56, which became available between the filing date of the prior application(s) and the national or international filing date of this application:

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U.S. APPLICATIONS		STATUS *(check one)*		
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED
		☐	☐	☐

PCT APPLICATIONS DESIGNATING THE U.S.					
PCT APPLICATION NO.	PCT FILING DATE	U.S. APPLICATION NUMBERS ASSIGNED (if any)			

I hereby appoint the following attorneys and agent(s) to prosecute said application and to transact all business in the U.S. Patent and Trademark Office connected therewith and to file, prosecute and to transact all business in connection with international applications directed to said invention:

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY (Includes Reference to Provisional and International (PCT) Applications)	Attorney's Docket No.

As a below named inventor, I hereby declare that:
My residence, post office address and citizenship are as stated below next to my name;
I BELIEVE I AM THE ORIGINAL, FIRST AND SOLE INVENTOR (IF ONLY ONE NAME IS LISTED BELOW) OR AN ORIGINAL, FIRST AND JOINT INVENTOR (IF PLURAL NAMES ARE LISTED BELOW) OF THE SUBJECT MATTER WHICH IS CLAIMED AND FOR WHICH A PATENT IS SOUGHT ON THE INVENTION ENTITLED:

COMPUTER-ASSISTED TICKETING SYSTEM WITH MULTIPLE OPERATORS

The specification of which (check only one item below):

- ☐ is attached hereto.
- ☐ was filed as United States Patent Application Number _____ on _____ and was amended on _____ (if applicable).
- ☒ was filed as International (PCT) Application Number PCT/FR00/01550 on June 7 th 2000 and was amended on _____ (if applicable).

☐ I HAVE REVIEWED AND UNDERSTAND THE CONTENTS OF THE ABOVE-IDENTIFIED SPECIFICATION, INCLUDING THE CLAIMS, AS AMENDED BY ANY AMENDMENT REFERRED TO ABOVE.

I ACKNOWLEDGE THE DUTY TO DISCLOSE TO THE U.S. PATENT AND TRADEMARK OFFICE ALL INFORMATION KNOWN TO ME TO BE MATERIAL TO PATENTABILITY AS DEFINED IN TITLE 37, CODE OF FEDERAL REGULATIONS, Sec. 1.56 (as amended effective March 16, 1992);

I do not know and do not believe the said invention was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to said application; that said invention was not in public use or on sale in the United States of America more than one year prior to said application; that said invention has not been patented or made the subject of an inventor's certificate issued before the date of said application in any country foreign to the United States of America on any application filed by me or my legal representatives or assigns more than six months prior to said application;

I hereby claim foreign priority benefits under Title 35, United States Code, §§ 119 (a)-(e) of any foreign application(s) for patent or inventor's certificate or of any International (PCT) Application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT International (PCT) Application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

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COUNTRY (if PCT, indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 U.S.C. §119
FRANCE	FR/99 07288	09/06/1999	☒Yes ☐No
PCT	PCT/FR00/01550	07/06/2000	☒Yes ☐No
			☐Yes ☐No
			☐Yes ☐No
			☐Yes ☐No

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below.

(APPLICATION NUMBER) (FILING DATE)

(APPLICATION NUMBER) (FILING DATE)